REMARKS

Claims 15-26, 29, 31, 33, and 39 are pending in the application. Claims 20-25 have been withdrawn pursuant to an election of species requirement. Claims 35-39 are added by this amendment. No claims are presently allowed.

New claims 35 and 36 recite that the source material is a homogenous material. Support for this amendment is found at page 10, line 11.

New claims 37 and 38 recite that substantially all of the deposited source material is transformed into the material of interest. Support for this amendment is found at page 10, lines 3-5.

New claim 39 recites that a single laser may be used as the first laser and the second laser, with adjustments to wavelength, pulse width, relative timing, polarization, or power. Support for this amendment is found at page 9, lines 6-8.

Claim Rejections – 35 U.S.C. § 103

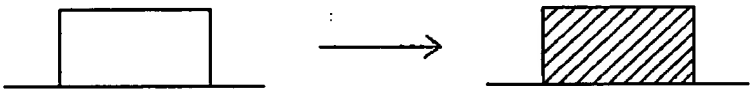
Claims 15-17, 26, 29, 31, 33, and 34 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Joyce, Jr. (US 5,292,559) in view of Gnanamuthu (US 4,716,270).

The invention of claim 15 is a method for creating a deposit of a material of interest on a receiving substrate. A first laser is directed through a laser-transparent target substrate having a coating that comprises a source material to cause the source material to be removed from the surface of the support and deposited on a receiving substrate. One or more monolayers of the source material adjacent to the target substrate are vaporized without vaporizing the rest of the source material. A second laser is directed to strike the deposited source material to transform the source material into the material of interest. Claim 26 is to a similar process, reciting a pulsed laser beam and a laser beam instead of a first laser and a second laser.

Joyce discloses a method of laser transfer using a laser transparent substrate with a laser absorptive polymer film and a metal multi-layered composite on the film (abstract). All or a portion of the film is vaporized by the laser, which transfers the metal composite to a substrate. A portion of the film may be transferred with the metal composite. (col. 3, lines 18-27).

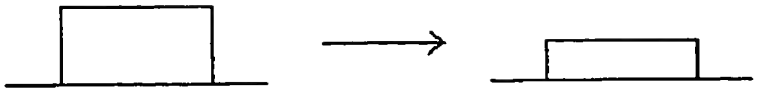
Gnanamuthu discloses a method of scribing a polymer maskant applied to a metal substrate by impinging a laser beam on the maskant (abstract).

In order to make a *prima facie* case of obviousness, the references must disclose each limitation of the claims. Neither reference discloses the transformation of a source material into a material of interest. "[T]ransforming the source material into the material of interest is any action effected by the second laser that changes the composition or the properties of the deposited material." Page 10, lines 1-3. The phrase "transform the source material into a material of interest" makes clear that the material of interest is made of transformed source material, rather than what remains after a removal of source material. It is possible that the second laser transforms all of the source material or only a portion of the source material (page 10, lines 3-5). The following diagram illustrates transformation of all of the source material into the material of interest. (Some vapors may be released during a decomposition, however, the bulk of the material remains on the substrate.)



When only the upper portion of the deposited source material is transformed, the result is a portion of material of interest on top of the untransformed portion of source material, as shown in the following diagram.

The Examiner stated that the deposited metal of Joyce having a portion of the polymer on it reads on the source material, and that the metal without the polymer, having been removed by the method of Gnanamuthu, reads on the material of interest. However, this is not a transformation of the source material into a material of interest. Although Gnanamuthu discloses a transformation of the polymer into a vapor, this vapor dissipates and forms no part of a material of interest. The remaining deposited metal composite retains its identity as source material and is not a material of interest. This is shown in the following diagram. Since the limitation regarding transformation is not disclosed in either of the references, a *prima facie* case has not been made.



Even if the process of Gnanamuthu is considered to be a transformation according to the present claims, the same transformation would occur in Joyce, as the polymer is vaporized. In the present invention, the source material is transferred without transforming it.

Further, the references do not disclose the use of a second laser or of a modification of the first laser for the transformation. In Joyce, a laser is used to vaporize the polymer. In Gnanamuthu a laser is used to vaporize the polymer. Thus, both lasers may be the same laser, as they are performing the same task. There is no disclosure that the lasers would necessarily have different wavelengths, pulse widths, relative timings, polarizations, or powers. The present claims specifically require two lasers, or one laser with two different sets of parameters.

In order to make out a *prima facie* case of obviousness under 35 U.S.C. 103, the rejection must also be supported by some reason, suggestion, or modification from the prior art as a whole that indicates that the person of ordinary skill would have combined or modified the references. There is no motivation to combine the references as they are nonanalogous arts under MPEP 2141.01(a). Joyce is in the field of laser direct writing. Gnanamuthu is in the field of lithography.

Further, Joyce teaches away from the proposed combination. Joyce states that "In a preferred embodiment thereof, the resulting energy build-up therein causes the remaining laser absorptive polymer to vaporize ..." col. 3, lines 57-60. It is preferred that no polymer be transferred with the metal. In the proposed combination, a relatively low power laser pulse would be used to transfer the metal with some polymer, and a second low power pulse would be used to remove the polymer. But Joyce teaches that it is preferable to remove all the polymer in a single high power pulse. This would also appear to be the more straight forward approach.

Although it is stated that any remaining polymer may be removed or stripped by procedures known in the art (col. 3, lines 36-39), presumably this is because chemical stripping would be easier than determining the laser power needed to vaporize all of the polymer without harming the metal. The proposed combination would not solve this problem.

Claims 16, 17, 29, and 33 and 31 and 34 depend from and contain all the limitation of claims 15 and 26 respectively, and are asserted to distinguish from the references in the same manner as claims 15 and 26. Further, as to claim 16, this claim recites pretreating the receiving substrate with a laser before the source material is deposited. Neither of the references discloses this step.

As to claims 29 and 31, these claims disclose that the second laser decomposes the source material to form the material of interest. The Examiner stated that the breaking of bonds during vaporization reads on decomposing. However, as explained above, complete vaporization of the polymer does not produce a material of interest on the substrate. Although decomposition may release some vapor, a non-vapor material, and not a useless residue, is left behind.

As to new claims 35 (dependent on claim 15) and 36 (dependent on claim 26), these claims recite that the source material is a homogenous material. However, both Joyce and Gnanamuthu disclose only layered composites. Joyce discloses a composite having layers of polymer, gold, nickel, and gold-flash (abstract). Gnanamuthu discloses a composite having layers of maskant and metal (abstract). These multi-layer composites rely on different layers for different purposes. The prior art does not disclose the transfer and transformation of a homogenous material.

As to new claims 37 (dependent on claim 15) and 38 (dependent on claim 26), these claims recite that substantially all of the deposited source material is transformed into the material of interest. However, even if Gnanamuthu did disclose the transformation of a source material, not all of such source material is transformed.

The Examiner rejected claims 18 and 19 under 35 U.S.C. § 103(a) as being unpatentable over Joyce in view of Gnanamuthu and further in view of Hirano (US 6,099,626).

Claim 18 recites that the source material is a homogeneous mixture of an organometallic compound and a metal powder. Hirano discloses an ink transfer system including a photo-thermal converter (col. 4, lines 18-23). The Examiner stated that Hirano teaches that a mixture of metal powders with organometallic compounds acts as an efficient light to heat converter. However, Hirano discloses metal powders and organic metallic inks separately, not as a mixture (col. 4, lines 41-42). It cannot be assumed that different kinds of inks can be mixed together to

produce another suitable ink. Since the inks in Hirano are vaporized, different amounts of heat may be needed to vaporize different kinds of ink. Further, this sentence in Hirano does not state that these materials are photo-thermal converters. Although this ungrammatical sentence is confusing, Applicants' interpretation of it is that the photo-thermal converter is either a metal film or a two-layer film of metal and ceramic. There are several possible inks, including metal fine particles and organic metallic inks.

Even if Hirano disclosed the mixture recited in claim 18 as a photo-thermal converter, that is not a source material. The photo-thermal converter of Hirano is "heat-resistant enough to continuously absorb the light energy of the laser light." Col. 4, lines 32-33. However, the source material does not continuously absorb the laser. It is allowed to absorb just enough to remove itself from the target substrate and deposit onto a receiving substrate. It absorbs a pulse from the second laser, which transforms it so that it is no longer source material. It does not continuously absorb the light. Further, the photo-thermal converter is used to heat an ink, and not to cause transfer or transformation of the photo-thermal converter.

It should also be noted that the laser power used in Joyce to cause the transfer would also transform the material of interest in claim 18. Joyce uses energy densities of about 8-18 J/cm^2 (Table 1). Example 1 in the present application uses only 225 mJ/cm^2 for the transfer.

As for claim 19, this claim recites several specific mixtures of metal powder and organometallic compound. None of these material are disclosed in Hirano or in the other cited art.

In view of the foregoing, it is submitted that the application is now in condition for allowance.

In the event that a fee is required, please charge the fee to Deposit Account No. 50-0281,

and in the event that there is a credit due, please credit Deposit Account No. 50-0281.

Respectfully submitted,

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